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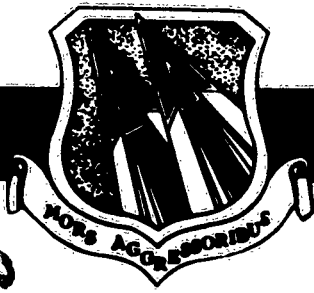
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73RD AIR DIVISION

WEAPONS

296 579

FINAL REPORT

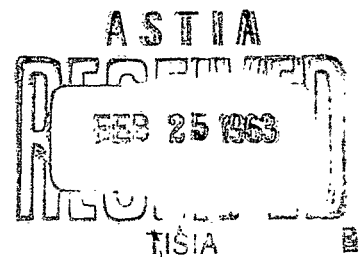
PROJECT ADC/73AD/62-29

A/P22S-3
SUIT CONTROLLER

296 579

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9 JANUARY 1963



Prepared by:

4750 Test Squadron
(OPERATIONAL)

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**4750TH TEST SQUADRON (OPERATIONAL)
UNITED STATES AIR FORCE
TYNDALL AIR FORCE BASE, FLORIDA**

**FINAL REPORT
PROJECT ADC/73AD/62-29
A/P22S-3 SUIT CONTROLLER**

9 January 1963

ABSTRACT

To prevent interference between the B-5 parachute harness and the suit controller on the larger size A/P22S-3 full pressure suits, ASD proposed that the harness be adjusted using higher than average index numbers and the controller be rotated 60° clockwise. Headquarters ADC directed an evaluation of proposed fix to determine the compatibility of the pressure suit and the parachute harness after the fix was accomplished.

There was no interference after the fix was accomplished. The tests were conducted in all possible pressure suit environments.

It is concluded that the ASD fix eliminates interference and causes no discomfort to the using aircrew.

It is recommended that ADC accept the fix and take action to amend the applicable technical orders.

FOREWORD

This is the final report for Project ADC/73AD/62-29, A/P22S-3 Suit Controller. The report is submitted in accordance with ADCR 55-49, dated 28 Sep 59, and ADC letter ADOOP-WT, dated 23 Oct 62.

The 4756th Physiological Training Flight gave assistance and advice during all phases of this project.

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INTRODUCTION

1. During previous tests conducted by the 4750th Test Squadron, it was discovered that interference existed between the B-5 parachute harness and the suit controller of larger size A/P22S-3 full pressure suits. During Project ADC/73AD/61-19, Hypoxic Warning Device, one aircrew member had a "Breko" fitting broken from the suit controller by his parachute harness. This break stopped the flow of oxygen for breathing and for suit inflation. This deficiency was brought to the attention of ADC and ASD. ASD proposed the following fix to alleviate the interference:

a. Use higher than average index numbers (at least one digit) to size adjust the B-5 harness when fitting an aircrew member wearing an A/P22S-3 full pressure suit.

b. Rotate the suit controller clockwise approximately 60° (one mounting screw hole).

2. This test was conducted to determine whether the fix alleviates the problem or not.

OBJECTIVES

3. Overall Command Objective: To determine whether the fix proposed to ADC by ASD on 4 Sep 62 prevents interference between the A/P22S-3 pressure suit controller and the B-5 parachute harness.

4. Specific Objectives: To determine whether 60 degree clockwise rotation of the A/P22S-3 suit controller and use of higher than average index numbers when size adjusting the B-5 parachute harness:

a. Prevents interference between the parachute harness and the suit controller or connecting leads.

b. Prevents undue pressure on the "Breko" fitting connecting leads that attach to the controller.

c. Prevents crew discomfort.

d. Prevents malfunctions or rupture of any portion of the life sustaining system due to harness interference under the following conditions:

- (1) Normal deflated suit operation in pressurized cockpit.
- (2) Pressurized suit operation in event of cockpit decompression.
- (3) During parachute descent (simulated).

DESCRIPTION OF TEST ITEM

5. A/P22S-3 Pressure Suit: The A/P22S-3 pressure suit is a full pressure suit with anti-exposure suit capabilities. The suit's oxygen supply and pressure are controlled and regulated by a suit controller built into the front right abdomen section. The suit controller is an integral part of the pressure suit.
6. Parachute Harness: The parachute harness is from the B-5 standard back type chute described in T.O. -14D1-2-1.

TEST RESULTS

7. The fix was accomplished as prescribed by ASD.
8. Pressure Chamber - Flight to 70,000' including rapid decompression from 25,000' to 65,000'. Results: Fix satisfactory.
9. Suspension and Jump Test - Pilot suspended in harness simulating parachute opening shock and descent. Results: Fix satisfactory.
10. Simulator Flight - Pilot flew standard ADC profile with suit inflated periodically throughout flight. Results: Fix satisfactory.
11. Flights in F-106B - Two flights simulating short duration and sustained high altitude operation. Results: Fix satisfactory.



Figure #1 shows interference between B-5 harness and suit controller before using higher than average index numbers to size adjust harness. Suit controller shown has not been rotated. Suit size is Medium Large Long.

Figure 1

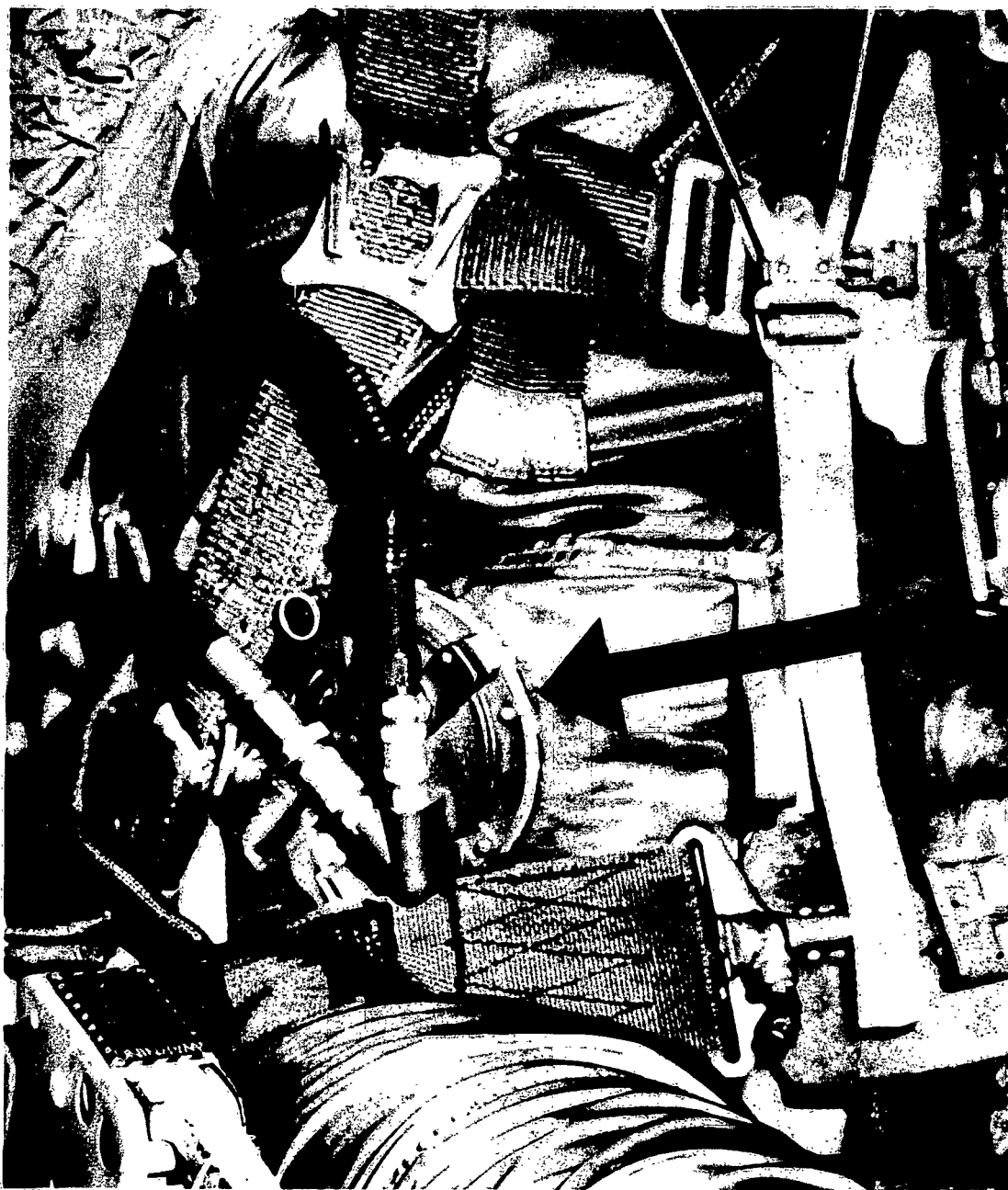


Figure #2 shows no interference after using higher than average index numbers to size adjust B-5 harness and with suit controller rotated clockwise 60 degrees. Suit size is Medium Large Long.

Figure 2

CONCLUSIONS

12. The ASD fix eliminates the interference between the A/P22S-3 suit controller and the B-5 parachute harness.

RECOMMENDATIONS

13. It is recommended that:

- a. ADC accept the ASD proposed fix.**
- b. The B-5 parachute harness be adjusted using higher than average (at least one digit) index numbers when used with A/P22S-3 full pressure suit.**
- c. The suit controllers for A/P22S-3 full pressure suits be rotated 60 degrees (one mounting screw hole) clockwise.**

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DISCUSSION

Two pilots were fitted with A/P22S-3 full pressure suits with the suit controller rotated 60 degrees. One with suit size Medium Large Long and the other Medium Large Short. Each pilot went through the standard altitude chamber pressure suit orientation flight with a B-5 parachute fitted using higher than average index numbers to size adjust the harness. The flight included: A climb to 40,000' to check suit operation, descent to 25,000', rapid decompression to 65,000', and climb to 70,000'. There was no interference or discomfort noted by either the pilots or the qualified observers present. Photo coverage confirmed the results noted by observers.

The pilot fitted with the Medium Large Long suit was suspended by the harness of a B-5 parachute harness to simulate parachute descent. The pilot made several jumps from a ladder to simulate opening shock of his parachute. The parts of the harness that had caused interference actually moved further from the suit controller when the pilot was suspended in the harness. There was no interference or discomfort.

The pilot fitted with the Medium Large Long suit flew one hour in the F-106 flight simulator. The pilot was fitted with a B-5 parachute adjusted as prescribed. The pressure suit was inflated several times during the mission as the pilot went through check list procedures. There was no interference between the suit controller and the harness. The pilot noted no discomfort.

Two flights were flown in an F-106B, modified to use full pressure suits, with interim seats. During the first flight, both pilots wore the pressure suits and B-5 parachutes. The Medium Large Long suit was fitted with an adapter that allowed the pilot to inflate the suit without having the cockpit altitude above suit inflation altitude of 35,000'. The flight was conducted at altitudes up to 50,000'. The cabin pressure was dumped at 50,000' and both suits operated normally. The pilot with the larger suit inflated his suit several times during the flight. The second flight was flown in an F-106B with only the pilot with the larger size suit wearing his pressure suit. The suit was fitted with the adapter allowing him to pressurize his suit at any time. The suit was inflated several times during the flight. The two flights confirmed that there was no interference between the suit controller and the parachute harness and that the fix caused no discomfort.

It was noted that seat lap belts of the soft nylon type did tend to fold in the area of the suit controller. This caused the lap belt buckle assembly to bend slightly away from the abdomen where it normally fits flat. No problem was noted using the stiff type seat belts. This slight problem is inherent when using the full pressure suit and the fix does not affect it.

The sling on the B-5 harness is harder to get under the buttocks when fitted properly but can be accomplished by the aircrew using a small amount of extra effort.

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